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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/644,141	08/20/2003	Hari Thirumoorthy	P16467	6481

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EXAMINER	
SWERDLOW, DANIEL	

ART UNIT	PAPER NUMBER
2615	

DATE MAILED: 06/19/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/644,141	THIRUMOORTHY, HARI	
	Examiner	Art Unit	
	Daniel Swerdlow	2615	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *17 April 2006 and 05 May 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-25 and 28-30* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-25 and 28-30* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 17 April 2006 has been entered.

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1 through 13 are rejected under 35 U.S.C. 102(b) as being anticipated by Sih (US Patent 5,559,881).

3. Regarding Claim 1, Sih discloses a method for canceling echo (i.e., signal modification) comprising: receiving a far-end speech (i.e., input) signal (Fig. 5, reference x(n); column 9, lines 14-16) at the input of an echo canceller filter (Fig. 5, reference 156, 158, 160); attenuating input samples relative to a preset value near the top of the range (i.e., to a value of a high amplitude portion of the input signal) when required and removing the attenuation when no longer required (i.e., dynamically scaling a binary range associated with filter taps) (column 17, lines 21-32); storing the scaled input values in the filter taps (i.e., in association with one of the taps) (Fig. 4,

reference 120; column 7, lines 3-10) and multiplying (i.e., modifying) the input signal sample values (i.e., input signal) by coefficients (i.e., amounts) associated with the input signal sample values (i.e., stored portion of the input signal) (Fig. 4, reference 120, 122, h; column 7, lines 3-10).

4. Regarding Claim 2, Sih further discloses the received signal is a voice (i.e., analog) signal (column 4, lines 48-49).

5. Regarding Claim 3, Sih further discloses a finite impulse response filter (Fig. 4).

6. Regarding Claim 4, Sih further discloses a tapped delay line (Fig. 4, reference 120) that stores amplitudes of all portions of the input signal.

7. Regarding Claim 5, Sih further discloses that the far end speech signal that corresponds to the input signal claimed produces (i.e., is a component of) the echo signal (column 6, lines 4-10).

8. Regarding Claim 6, Sih further discloses outputting an echo replica signal (i.e., modified input signal) from the filter (Fig. 5, reference y^(n); column 10, lines 1-4).

9. Regarding Claim 7, Sih further discloses attenuating input samples (i.e., scaling a binary range associated with filter taps) (column 17, lines 21-32) relative to a preset value near the top of the range (i.e., under which a desired portion of actually measured input values falls).

10. Regarding Claim 8, Sih further discloses a range of values between -8031 and +8031 that can inherently be represented by a plurality of bits (column 17, lines 21-26).

11. Regarding Claim 9, Sih further discloses attenuating input samples by 1.5 dB (i.e., the binary range is scaled proportionately) (column 17, lines 26-32).

12. Regarding Claim 10, Sih further discloses a range of values between -8031 and +8031 that are inherently represented by the negative of the absolute value of the high amplitude and the positive of the absolute value of the high amplitude (column 17, lines 21-26).

13. Regarding Claim 11, Sih further discloses a range of values between -8031 and +8031 being the range provided by the vocoder. As such, the largest negative value binary value is the largest negative value those bits from that vocoder can represent and the largest positive is the largest positive value those bits from that vocoder can represent (column 17, lines 21-26).

14. Regarding Claim 12, Sih further discloses the high value being a value at the top of the range (i.e., the largest of a plurality of measured amplitudes) (column 17, lines 21-26).

15. Regarding Claim 13, Sih further discloses the high value being a value at the top of the range (i.e., a function of a sampling of a plurality of measured amplitudes) (column 17, lines 21-26).

Claim Rejections - 35 USC § 103

16. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

17. Claims 14 through 25 and 28 through 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lu (US Patent 6,768,796) in view of Kawata et al (US Patent 5,029,121).

18. Regarding Claim 14, Lu discloses a finite impulse response adaptive filter echo canceller (Fig. 8; column 8, lines 50-57) in which a sequence of coefficients (i.e., $h_0(n)$ through $h_{L-1}(n)$)

represent the impulse response of the echo-causing system (i.e., echo amplitude). Kawata discloses a finite impulse response filter (Fig. 1; column 1, lines 19-49) in which tap weights (i.e., values associated with a tap) are scaled by: determining a storage capacity of a coefficient register (i.e., a range of values that may be held in binary in association with the tap) (column 5, lines 61-64); determining the location of the highest order effective bit in a coefficient (i.e., a range within which a normal echo amplitude of an audio signal falls) (Fig. 3b; column 5, line 65-column 6, line 11); and shifting the bits in the coefficient to store only the highest order effective bit and less significant bits individually for each coefficient every time a coefficient is stored (i.e., dynamically scaling the range of values that may be held in binary in association with the tap to the range within which normal echo amplitude falls). Kawata further discloses that such an arrangement improves precision and prevents error (column 3, lines 65-68). It would have been obvious to one skilled in the art at the time of the invention to apply coefficient scaling as taught by Kawata to the echo canceller taught by Lu for the purpose of realizing the aforesaid advantages.

19. Regarding Claim 15, Lu further discloses determining the coefficients (i.e., measuring echo amplitude) using the filter (column 6, lines 10-20). Kawata further discloses shifting the bits in the coefficient to store only the highest order effective bit and less significant bits (i.e., storing a value corresponding to the measured amplitude in association with the filter tap based on the scale).

20. Regarding Claim 16, Lu further discloses subtracting summed filter tap products from an audio signal (r(n)) (i.e., reducing the audio signal by the amplitude associated with the filter tap) (Fig. 8, reference 460; column 6, lines 26-33).

21. All elements of Claims 17 through 22 are comprehended by Claims 14 through 16. As such, Claims 17 through 22 are rejected on the same grounds as Claims 14 through 16.

22. Regarding Claim 23, Lu discloses an Internet Telephony Gateway (Fig. 5, reference 302A; column 7, lines 25-48) that corresponds to the voice over internet protocol communication device claimed and performs a digitization, compression and packetization process (i.e., comprises an analog to digital converter and a digital audio transmitter coupled to the analog to digital converter) and reverses the digitization, compression and packetization process (i.e., comprises a digital audio receiver and a digital to analog decoder coupled to the digital audio receiver) (column 7, lines 38-42 and 58-60). Lu further discloses a finite impulse response adaptive filter echo canceller (Fig. 8; column 8, lines 50-57) in which a sequence of coefficients (i.e., $h_0(n)$ through $h_{L-1}(n)$) represent the impulse response of the echo-causing system (i.e., echo amplitude). Lu further discloses subtracting summed filter tap products from an audio signal (r(n)) (i.e., having an output to transmit a second signal equivalent to the first signal reduced by the second amplitude) (Fig. 8, reference 460; column 6, lines 26-33). Kawata discloses a finite impulse response filter (Fig. 1; column 1, lines 19-49) in which tap weights are scaled by: determining a storage capacity of a coefficient register (column 5, lines 61-64); determining the location of the highest order effective bit in a coefficient (Fig. 3b; column 5, line 65-column 6, line 11); and shifting the bits in the coefficient to store only the highest order effective bit and less significant bits individually for each coefficient every time a coefficient is stored (i.e., dynamically scaling the range of values to a high amplitude incident on the first signal and storing a second amplitude in accordance with the scale). Kawata further discloses that such an arrangement improves precision and prevents error (column 3, lines 65-68). It would have been

obvious to one skilled in the art at the time of the invention to apply coefficient scaling as taught by Kawata to the echo canceller taught by Lu for the purpose of realizing the aforesaid advantages.

23. Regarding Claims 24 and 25, Lu further discloses the gateway connected to analog telephone lines (column 7, lines 32-36) (i.e., converts digital audio to analog audio and analog audio to digital audio).

24. Claims 28 through 30 are essentially similar to Claims 14 through 16 and are rejected on the same grounds.

Response to Arguments

25. Applicant's arguments filed 17 April 2006 have been fully considered but they are not persuasive.

26. Applicant alleges that the cited prior art fails to disclose dynamic scaling as claimed in amended independent Claims 1, 14, 17, 23 and 28. Examiner respectfully disagrees.

27. Regarding Claim 1, as shown in the prior art rejection above, Sih discloses applying attenuation to input samples relative to a preset value near the top of the range (i.e., to a value of a high amplitude portion of the input signal) when required and removing the attenuation when no longer required (column 17, lines 21-32). As such, the scaling taught in Sih is dynamic.

28. Regarding Claims 14, 17, 23 and 28, as shown in the prior art rejection above, Kawata discloses shifting the bits in the coefficient to store only the highest order effective bit and less significant bits individually for each coefficient every time a coefficient is stored. As such, the scaling taught in Kawata is dynamic.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daniel Swerdlow whose telephone number is 571-272-7531. The examiner can normally be reached on Monday through Friday between 7:30 AM and 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Sinh H. Tran can be reached on 571-272-7564. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Daniel Swerdlow
Primary Examiner
Art Unit 2615

ds
14 June 2006